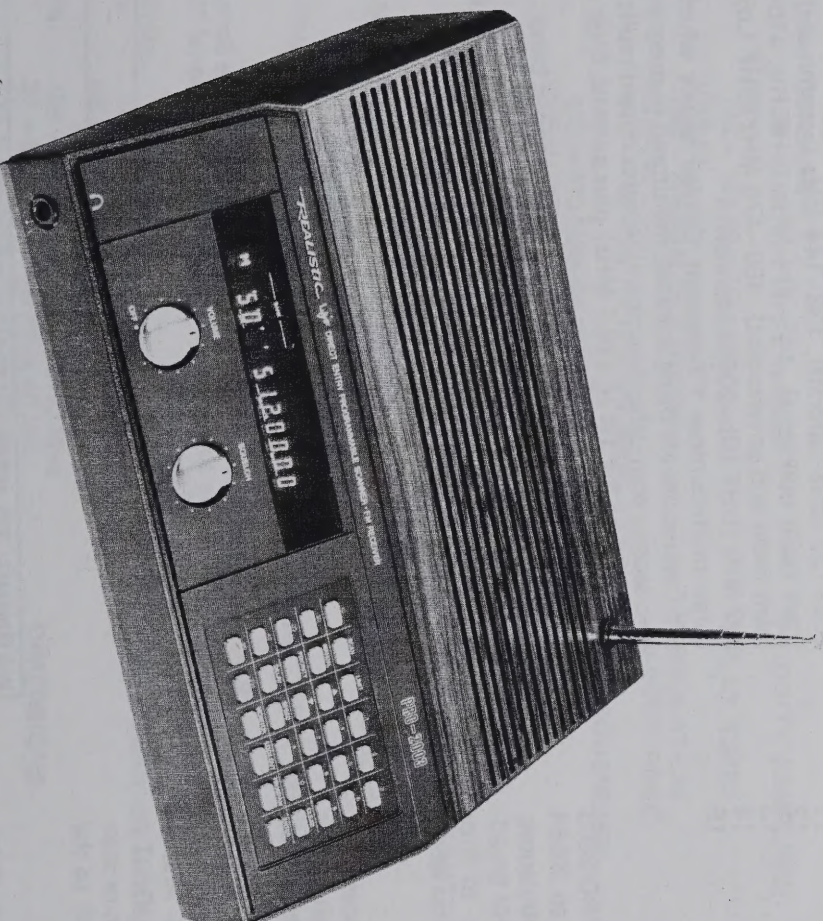


# Programmable AM/FM Scanning Receiver

with Direct Keyboard Entry System

VHF: 30-50/88.1-107.9/108-136/138-174 MHz UHF: 410-512 MHz



**PRO-2003**

**OWNER'S  
MANUAL**

PLEASE READ BEFORE  
USING THIS EQUIPMENT

**REALISTIC®**

CAT. NO.  
20-1117

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION



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You'll hear all the action with your new Realistic PRO-2003 Programmable Scanning Receiver! You'll have direct access to 20584 different frequencies in nine radio bands—police, fire, ambulances, aircraft, ham radio operators, transportation services and FM broadcast! And you can program your PRO-2003 to scan up to fifty channels and ten FM Broadcast Band memory channels so you won't miss any of the excitement.

The secret to the PRO-2003 is a custom-designed microprocessor—a computer on a chip! The front panel Keyboard lets you easily enter and change frequencies whenever you wish. The microprocessor also gives you special functions not found on other scanning receivers. Curious about what's on the air in your area? The PRO-2003 will automatically "search" frequency ranges of your choice for active stations—you can locate new stations and services easily! And if there's a frequency you're especially interested in, the PRIORITY Key will make sure you never miss a call on it. You can listen or scan other channels and your PRO-2003 will automatically switch to the channel when a call is received on it!

Other features you'll appreciate include Lockout to skip over channels during scanning and fast/slow search and scanning rates.

Your PRO-2003 achieves its superior performance through the use of the very latest in solid-state technology. In addition to the microprocessor, the PRO-2003 has a phase-locked loop (PLL) IC, 8 CMOS ICs, 10 integrated circuits, 41 transistors, 83 diodes and a Fluorescent Display.

## ADDITIONAL FEATURES

- \* Covers 30–50 MHz (VHF Lo), 88.1–107.9 MHz (FM Broadcast), 108–136 MHz (aircraft), 138–144 MHz (government), 144–148 MHz (ham radio operators), 148–174 MHz (VHF Hi), 410–450 MHz (ham radio and government), 450–470 MHz (UHF Lo) and 470–512 MHz (UHF Hi)—20584 channels!
- \* Large multi-purpose Fluorescent Display shows which channels and frequencies are being scanned, monitored or programmed.
- \* Two second scan delay function eliminates missed replies.
- \* Crystal filter for 1st IF (10.7 MHz) plus ceramic filter for 2nd IF (455 kHz).
- \* Two ceramic filters (10.7 MHz) for FM broadcast band.
- \* AC and DC (negative ground) operation.
- \* 9-volt battery backup holds memorized frequencies in case of power failure.

For Your own protection, we urge you to record the Serial Number of this unit in the space provided. You'll find the Serial Number on the back panel of this unit.

Serial Number

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.**



# **SPECIFICATIONS**

## **SEMICONDUCTOR COMPONENTS:**

1 LSI Microprocessor system, 1 LSI PLL system, 8 C-MOS ICs, 10 ICs, 41 transistors and 83 diodes.

## **RECEIVING SYSTEM:**

Superheterodyne with digital synthesizer to receive any of 20,584 programmable frequencies.

## **FREQUENCY COVERAGE:**

VHF-Lo  
30 – 50 MHz (in 5 kHz steps)  
FM broadcast  
88.1 – 107.9 MHz (in 200 kHz steps)  
Aircraft  
108 – 136 MHz (in 25 kHz steps)  
Government  
138 – 144 MHz (in 5 kHz steps)  
Ham  
144 – 148 MHz (in 5 kHz steps)  
VHF-Hi  
148 – 174 MHz (in 5 kHz steps)  
Ham/Gov't  
410 – 450 MHz (in 12.5 kHz steps)  
UHF-Lo  
450 – 470 MHz (in 12.5 kHz steps)  
UHF-Hi ("T")  
470 – 512 MHz (in 12.5 kHz steps)  
Any 50 channels in any band combinations. (10 channels x 5 Banks) and 10 channels FM broadcast band.

## **CHANNELS OF OPERATION:**

### **SENSITIVITY**

AM: 20 dB Signal-to-Noise ratio at 60% modulation:

108 – 136 MHz 1.0  $\mu$ V

FM: 20 dB Signal-to-Noise ratio at 3 kHz

Deviation:

30 – 50 MHz 0.5  $\mu$ V  
138 – 174 MHz 0.5  $\mu$ V  
410 – 512 MHz 1.0  $\mu$ V

FM broadcast:

30 dB Signal-to-Noise ratio at 22.5 kHz

Deviation:

88.1 – 107.9 MHz 5.0  $\mu$ V

## **SPURIOUS REJECTION:**

108 – 136 MHz 50 dB at 122 MHz  
30 – 50 MHz 50 dB at 40 MHz  
138 – 174 MHz 50 dB at 160 MHz  
410 – 512 MHz Not specified.  
88.1 – 107.9 MHz 50 dB at 99.9 MHz

## **SELECTIVITY:**

Lo, Air, Hi, UHF:

$\pm$ 9 kHz, –6 dB  
 $\pm$ 15 kHz, –50 dB  
 $\pm$ 100 kHz, –6 dB  
 $\pm$ 300 kHz –50 dB

FM broadcast:

## **IF REJECTION:**

10.7 MHz 80 dB at 154 MHz

## **SCANNING RATE:**

Fast 8 channels/sec.  
Slow 4 channels/sec.

## **SEARCH RATE:**

Fast 8 steps/sec.  
Slow 4 steps/sec.

## **PRIORITY SAMPLING:**

2 seconds

## **DELAY TIME:**

2 seconds

## **MODULATION ACCEPTANCE:**

$\pm$ 7 kHz and 75 kHz

## **I.F. FREQUENCIES:**

10.7 MHz and 455 kHz

## **FILTERS:**

1 crystal filter, 1 ceramic filter for Lo, Air, Hi, UHF  
2 ceramic filter for FM broadcast

## **SQUELCH SENSITIVITY:**

Lo, Air, Hi, UHF:

Threshold Less than 1.0  $\mu$ V  
Tight (S+N)/N 25 dB  
Threshold Less than 5.0  $\mu$ V  
Tight (S+N)/N 45 dB

FM broadcast:

## **ANTENNA IMPEDANCE:**

50 ohms

## **AUDIO POWER:**

2 watts maximum

## **BUILT-IN SPEAKER:**

3" (7.7 cm)

## **POWER REQUIREMENTS:**

AC, 120 Volts, 60 Hz, 20 watts  
DC, 12–15 Volts, 10 watts  
9-volt battery for Memory back-up

## **DIMENSIONS:**

3-1/8" x 11-1/4" x 9" HWD  
(8 x 28.5 x 23 cm)

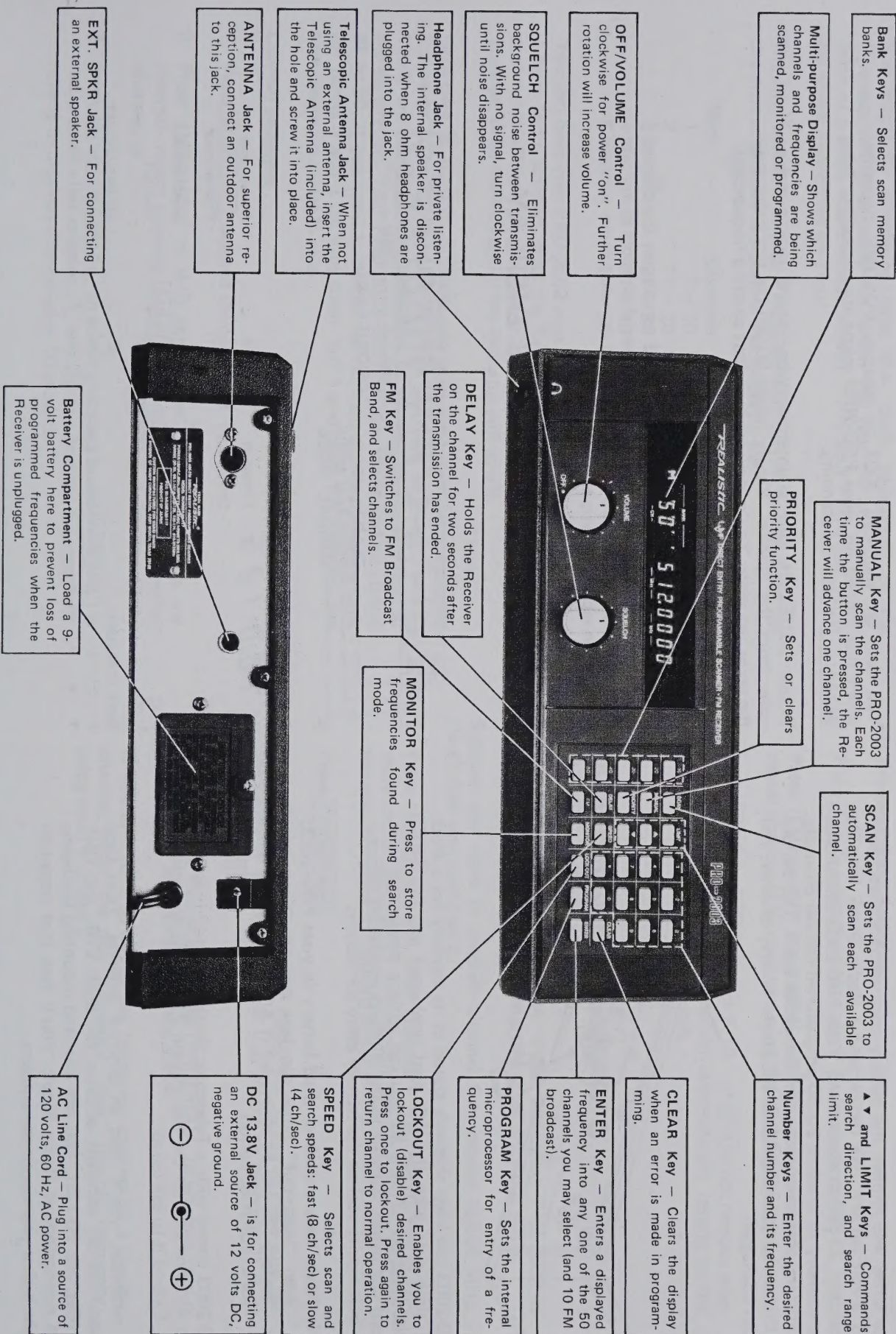
## **WEIGHT:**

4.4 lbs (2 kg)





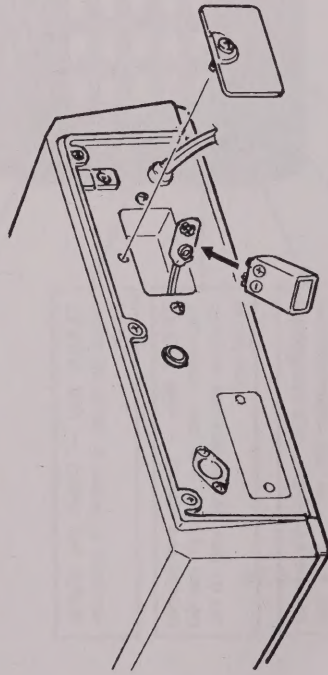
# A QUICK LOOK AT YOUR PRO-2003





## PREPARATION FOR USE

Loose the screw and remove the battery compartment cover; then snap in a 9-volt battery. (We recommend a Radio Shack long-life alkaline battery, 23-553 or equivalent.) Your PRO-2003 contains an electronic memory to preserve the 50 programmed scanner channels, and 10 program channels on the FM Broadcast Band. The battery protects this memory during AC or DC power failure, or when you have the set unplugged.



Your PRO-2003 can keep channels stored in its memory for a short period of time even with the AC cord unplugged and the 9-volt battery disconnected. (This is so you can replace the battery with the AC cord unplugged, without losing all the programmed information.) For best results, replace the battery every six months.

**CAUTION:** Never leave a weak or dead battery in your PRO-2003; even "leakproof" types can leak damaging chemicals. Battery life will be shortened if AC or DC power is off for a prolonged period.

Your PRO-2003 comes with a Telescopic Antenna. Insert it into the Telescopic Antenna jack on the top of your PRO-2003 and screw it into place. Extend it to full length.

For best reception, you'll need an external antenna. Your local Radio Shack has an excellent antenna for both VHF and UHF reception (Cat. No. 20-176). You can also find mounting hardware, cables and connectors at Radio Shack. You'll find that reception improves the higher you mount the antenna.

Connect your Receiver to a standard 120 volt AC wall outlet.

## OPERATING YOUR PRO-2003

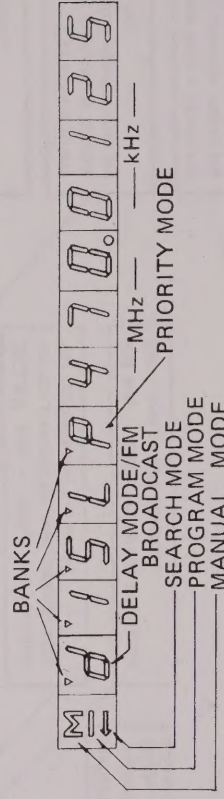
You turn on your PRO-2003 by rotating VOLUME clockwise. When first turned on, your PRO-2003 might start scanning. Press **[MANUAL]** to stop the scanning.

Rotate SQUELCH fully counterclockwise. You'll hear a rushing noise from the Speaker. Slowly rotate SQUELCH clockwise until the noise just stops. You're now ready to start entering frequencies!

## Understanding the Display

The Fluorescent Display on your PRO-2003 can display the channel number, the frequency being received and special symbols to indicate different functions. Here's a brief rundown on what those symbols mean when receiving stations.

## RECEIVER OPERATIONS DISPLAY



4	7	0.	0	1	2	5	...	Frequency	M	...	Manual mode
d	d						...	Delay mode	=	...	Program mode
p							...	Priority mode	=	...	Search mode
1	5						...	Channel indicator	L	...	Lock out
Bank Indicators									F	...	FM BROADCAST
1	2	3	4	5			...	Channel Banks			
▼	▼	▼	▼	▼							



## About Those Banks . . .

You might be wondering what the "bank indicators" on the Fluorescent Display stand for. When you hear the word bank, you think of a place where money is kept . . . in your PRO-2003, banks are where frequencies are kept!

The fifty channels of your PRO-2003 are stored in five Banks of ten channels each. They're stored in the following way:

Bank	Channels	Key
1	1 — 10	<b>[10]</b>
2	11 — 20	<b>[20]</b>
3	21 — 30	<b>[30]</b>
4	31 — 40	<b>[40]</b>
5	41 — 50	<b>[50]</b>

You can have your PRO-2003 scan any or all five Banks. If you want a bank to be scanned, press the Key for that Bank; the indicator for that bank will light on the display. If you don't want that bank to be scanned, press the Key again; the indicator will go off.

Let's take an example. Suppose you only want to monitor channels 1 through 10 and 21 through 30. Press the Keys for Banks 1 and 3. You'll see the Bank Indicators light up on the Display as shown in the illustration. Your PRO-2003 will now scan channels 1 to 10 and 21 to 30. If you want to change the channels scanned, press the Keys for Banks 1 and 3 (to turn them "off") and press the Keys for the new ranges you want to scan.

### Channel Selection

1. Press **[MANUAL]** to select the MANUAL mode.
2. Press **[MANUAL]** to shift the channel. Each press shifts one channel—repeat pressing **[MANUAL]** until you reach the desired channel, or
3. Press **[1]** **[5]** **[MANUAL]** to select channel 15. If **[MANUAL]** is not pressed after pressing **[1]** and **[5]** the Scanner automatically reverts to previous channel after 10 seconds.

### FM Broadcast Band Selection:

1. Press **[FM]** to select the FM mode; F 1 will be displayed.
2. Press **[FM]** to shift the channel. Each press shifts one channel—repeat pressing **[FM]** until you reach the desired channel, or
3. Press **[1]** **[0]** **[FM]** to select F 10. If **[FM]** is not pressed after pressing **[1]** and **[0]**, the Scanner automatically reverts to the previous channel after 10 seconds.

## Programming Your Scanner

### Public Service Frequencies

Before programming frequencies, make sure your PRO-2003 is turned on and the SQUELCH is adjusted as we described earlier.

Suppose you want to program channel 1 to receive 162.55 MHz. Here's how you would do it:

1. Press **[MANUAL]** and select channel 1. You can do this in two ways: press **[MANUAL]** continuously until the Display indicates channel 1 or press **[1]** **[MANUAL]**.
2. Press **[PROGRAM]**.
3. Press **[1]** **[6]** **[2]** **[.]** **[5]** **[5]**. Check the Display to make sure the frequency it shows is the one you meant to program. If it is, press **[ENTER]**.
4. To add more frequencies, press **[PROGRAM]** to advance to the next channel and follow the steps above.
5. If you ever want to change the frequency entered for a specific channel, enter the new frequency "over" the old frequency, using steps 1, 2, and 3.



## FM Broadcast Frequencies

Suppose you want to program F 1 to receive 88.100 MHz. Here's how you would do it:

1. Press **[FM]** and select channel F 1: press **[FM]** continuously until the Display indicates F 1 or press **[1]** **[FM]**.
2. Press **[PROGRAM]**.
3. Press **[8]** **[8]** **[1]**—check the display to make sure the frequency it shows is the one you meant to program; if it is, press **[ENTER]**.
4. To add more frequencies, press **[PROGRAM]** to advance to the next channel and follow the steps above.
5. If you ever want to change the frequency entered for a specific channel, enter the new frequency "over" the old one using steps 1, 2 and 3.

If **[ENTER]** is not pressed after pressing the numeric keys, it reverts to previous mode after 10 seconds.

Make a mistake while entering a frequency? Simply press **[CLEAR]**, enter the correct frequency and press **[ENTER]**. If you're entering a new frequency in place of an old one, the old frequency won't be "erased" when you press **[CLEAR]**. It will remain stored on that channel until you correctly enter a new frequency and press **[ENTER]**.

You'll hear a "beep" sound as you press the various keys. This lets you know the Key has been properly entered into your PRO-2003.

**Note:** Set the SQUELCH control fully counter-clockwise when listening to FM broadcasts.

When listening to FM broadcasts, the Priority feature might not be usable because the SQUELCH setting necessary for channel 1 will not allow the FM channel to be heard. Also, the chopping sound caused by the priority check can be annoying, when listening to music. In either case, simply cancel the Priority function.

## Using the Scanning Function

Your PRO-2003 will automatically scan all the channels you've programmed and stop whenever it finds a signal. To scan channels, press the **[SCAN]** Key.

*Important!* Your PRO-2003 won't scan unless SQUELCH is set to the point where no sound is heard if a signal isn't being received.

You can select which of the five Banks your PRO-2003 will scan by pressing the appropriate Bank Keys as we mentioned earlier. You can scan any combination of Banks, from one to all five.

You can't "turn off" all the Banks—pressing the last key out of the 5 Bank keys will not turn off that bank. One Bank always remains on.

Scanning function over FM Broadcast Channels (F 1 to F 10) is not possible—you must select the desired channel manually.

## Lockout Function

You can't "lockout" all the Channels. All channels in a Bank can't be locked out—try locking out all the channel in one bank. When you reached to the last channel, pressing **[LOCKOUT]** will have no effect. One channel in each Bank always remains. This is to maintain the scanning function: if all channels are locked out, scanning will not be possible.

However, if you don't want to hear any channels in a given bank, lockout the entire Bank by pressing its BANK button so that the BANK indicator goes off.

1. Press **[MANUAL]** to stop scanning. Continue to press **[MANUAL]** to advance to the channel you want to lock out. Or press the numbers of the desired Channel and **[MANUAL]**.
2. When you reach the channel, press **[LOCK OUT]**. The Display will show **L** to indicate that this channel will be skipped over during scanning.  
**Lockout does not work on FM Broadcast channels.**
3. To release lockout, press **[MANUAL]** to stop scanning. Advance to the channel that is locked out and press **[LOCK OUT]** again. **L** will disappear from the Display.





## SPEED Selection

Your PRO-2003 will normally scan channels at a rate of 4 channels per second. If you press **[SPEED]**, channels will be scanned at a rate of 8 per second. Press **[SPEED]** again to return to a rate of 4 per second.

Certain programmed frequencies could be missed at the high-speed scanning—select the speed carefully.

## Priority Function

You might want to scan other channels yet not miss a call on a channel of particular interest to you (police, fire, ambulance, etc.). The Priority function will let you scan other channels—but if a call is received on the Priority channel, your PRO-2003 will automatically switch to the Priority channel! Here's how to use the Priority function:









1. Only Channel 1 can be used as the Priority Channel: Key the desired frequency into channel 1. It will be checked every 2 second.
2. Priority works only when the unit is in Scan, Manual or FM Broadcast Band mode.
3. Press **[PRIORITY]** to start Priority function. A  will appear on the display.
4. Press **[MANUAL]**, **[SCAN]** or **[FM]** to listen to other channels. Your PRO-2003 will check the Priority Channel and switch to it if a signal is received.
5. To cancel Priority, press **[PRIORITY]** again. The  will disappear from the Display.

*Important!* Your PRO-2003 won't function unless SQUELCH is set to the point where no sound is heard if a signal isn't being received.

## SEARCHING WITH YOUR PRO-2003









### Public Service Frequencies

One great feature of your PRO-2003 is its ability to search for frequencies being used. This means you can hear all the action on the airwaves in your area! To use this great feature, follow these steps:

1. Press **[PROGRAM]**.
  2. Press **[LIMIT]**. Enter the lower limit of the frequency range to be searched (such as 45.00 MHz). Press **[ENTER]**.
  3. Press **[LIMIT]** again. Enter the upper limit of the frequency range to be searched (such as 46.00 MHz). Press **[ENTER]**.
  4. Press either  or  to start Search.  will start Search from highest frequency and go down while  will start from the lowest frequency and go up.
  5. You can control the speed of the Search by using the **[SPEED]**. Key the same way you use it during scanning.
  6. Search will stop when a frequency is found with a signal. To restart Search, press  or . While  or  is held searching will not stop.
- In the **PROGRAM** mode, the search range will be displayed each time **[LIMIT]** is pressed. It is impossible to change the lower frequency only: to change the lower frequency you must change the higher frequency. The higher frequency can be changed any time.

### FM Broadcast Frequencies

FM Broadcasting Band which spans 88.100 – 107.900 MHz is programmed at 200 kHz step. To "search" for the FM Broadcast Band:

1. Press either  or  to start Search.  will start Search from the highest frequency and go down while  will start from lowest frequency and go up.
2. You can control the speed of the Search by using **[SPEED]**.
3. Search will stop when a frequency is found with a signal. To restart Search press  or . While  or  is held, searching will not stop.



You can step through every possible FM frequency by setting the SQUELCH control fully counter-clockwise and then pressing either the **▲** or **▼** button. Move the SQUELCH control clockwise for automatic searching for strong stations.

## Storing Frequencies

If you want to enter some of the frequencies found during Search, do this:

1. Press **MONITOR** when your PRO-2003 finds a frequency you want to store.
2. Use the **MANUAL** Key to select a channel for the frequency Your PRO-2003 found. The Display will show the frequency currently stored on the channel, but don't worry—the old frequency will be erased when you start to enter the new one. For FM Broadcast Band, use **FM** instead of **MANUAL**.
3. Press **PROGRAM**.
4. Press **MONITOR** again. The new frequency found during the Search will be displayed.
5. Press **ENTER** to put the new frequency into the channel in place of the old frequency.
6. Press either **▲** or **▼** to resume the Search. To return to Manual or Program operation, press **MANUAL** or **PROGRAM**. To resume the Search from one of the limit frequencies, press **LIMIT** and then **▲** or **▼**.

## Delay Function

When your PRO-2003 is scanning, it will stop whenever it finds a signal on a channel. As soon as the signal ends, the scanning function will resume. Most communications heard will be two-way. To make sure you don't miss any replies, press **DELAY**. This will cause your PRO-2003 to stay on a channel for two seconds after the end of a transmission, giving you time to hear any reply. To release the Delay function, press **DELAY** again. The Delay indicator will show on the Display when the Delay function is used.

## ERROR INDICATIONS

Sometimes when you try to enter a frequency for a channel or as a Search range limit, you will see **ERROR**, on the Display. This means the frequency is in error and you won't be able to enter it into your PRO-2003.

Such frequency errors usually mean you've entered a frequency outside the ranges your PRO-2003 operates on (such as 225.00 MHz) or you've put the decimal point in the wrong place (14.682 MHz instead of 146.82 MHz). Check carefully to find your mistake and then press **CLEAR**. You can now enter the correct frequency.

## ALL CLEAR FUNCTION

Your PRO-2003 provides an ALL CLEAR Function.

If you ever want to clear all programmed Memory (initialize the CPU in technical jargon), do this:

Press **1** and **CLEAR** simultaneously, and turn the Power Switch on. All memory will be cleared and frequency will show 000.0000.

## In case you're wondering . . .

. . . the tuning range of your PRO-2003 is permanently stored in the microprocessor chip. There's no way it can be extended or altered—even by a skilled electronics technician. So if you try to enter a frequency not in the PRO-2003's tuning ranges, you'll get an error message every time! To listen to CB, shortwave or broadcasting bands, you'll need another receiver designed for that purpose.



## BIRDIES

Some frequencies may be difficult or impossible to receive. If you program-in one of these, the Scanner may lock up and you hear only noise. These "birdies" are the products of internally generated signals mixing with external signals like TV and FM broadcasts. Telescopic antennas are much more likely to pick up these undesirable signals—that is another good reason for getting an outdoor, base-station type antenna for home installations.

If the interference is not severe, you may be able to use SQUELCH to cut out such annoying birdies.

A few of the most common birdies to watch out for are listed below.

Low Band	FM Broadcast	Air Band	Hi Band
30.030 MHz }	94.900 MHz 95.100 95.300	108.800 MHz 115.200 119.400	140.795 MHz 140.800 140.805
30.090 31.990 }	96.100 }	121.600 125.800 }	146.420 }
32.010 32.070 }	97.700	125.875 128.000 131.900	146.440 149.390 }
32.150 35.800 }		132.150 }	149.410 151.065 }
35.855 36.800 }			151.085 153.190 }
36.900 38.395 38.400 38.405 42.600 }			153.500 153.590 }
42.895 44.790 }			153.605 162.190 }
44.810 45.575 }			162.205 166.395 }
45.605 46.310 }			166.410 }
46.415 48.675 48.795			

Even with the SQUELCH control set to maximum, scanning or searching may stop on or around some of the frequencies listed. If the spurious signal is strong enough (above 20  $\mu$ V in technical terms) you can listen to it, but the Receiver will not auto scan/search.

## INSTALLATION

In any communications receiver installation, the antenna is one of the most important parts of the set-up. Although the telescopic antenna we've included will be adequate for strong local signals, the best reception will result from a multi-band outdoor antenna. It should be mounted as high as possible since the VHF and UHF signals your Receiver picks up travel in a straight line. The higher your antenna, the better your reception. Your local Radio Shack can help you in the selection of antennas, cables and accessories. (They can also advise you on the most popular frequencies in your area.)

## ACCESSORIES

A pair of headphones can be a very useful accessory. In areas where a high noise is present (in a factory, at the scene of a fire or accident, etc.), or when you want to listen privately, use headphones. Your Radio Shack store has a selection for your PRO-2003. Just plug them into the front panel headphone Jack.

You can use our 12V DC Power cord 270-1534A in your vehicle and power your PRO-2003 directly from the battery in your vehicle.





Using receivers capable of covering police, fire, emergency and ambulance frequencies in your car may be restricted by law in some areas. Before installing your PRO-2003 in your car, check to be sure of the regulations in your locality.

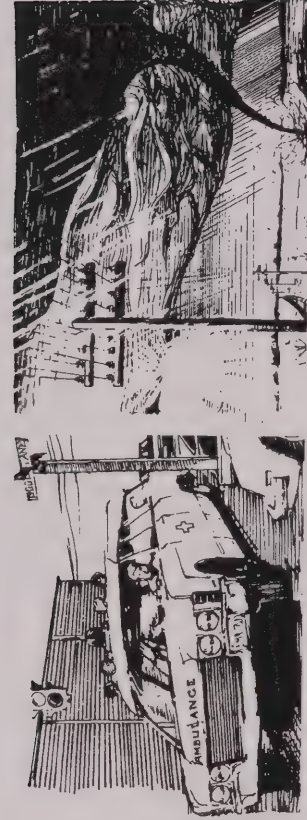
## GUIDE TO THE ACTION BANDS

Lots of things are going on that most of us are never aware of. But, with the right frequencies programmed into your PRO-2003, you can monitor such exciting signals. You'll have to do a little investigating in your community to find out what services are active and on what frequencies.

What to listen for and where? That is a little difficult for a specific answer. Each area of the country can and will use different channels. All we can do is give you some general pointers and then let you take it from there.

Find out if there is a local club which monitors these frequencies. Often a local electronics repair shop that does work on the equipment can give you the channel frequencies used by local radio services. A volunteer police or fire employee can also be a good source of this information.

An interesting service is the Mobile Telephone. FCC has assigned this service channels in the range of 152.51 to 152.81 MHz at every 0.030 MHz (channels are 30 kHz apart). Also, 454.375 to 454.95 MHz with channels 25 kHz apart from 454.375 to 454.625 and then every 50 kHz up to 454.95.



You can hear air navigation between 108 — 118 MHz. Communications between aircraft and airport control towers can be found between 118 — 136 MHz.

As a general rule on VHF, most activity will be concentrated between 153.785 and 155.98 and then again from 158.73 to 159.46 MHz. Here you'll find local government, police, fire and most such emergency services. If you are near a railroad yard or major railroad tracks, look around 160.0 to 161.9 for signals.

In some of the larger cities, there has been a move to the UHF bands for these emergency services. Here, most of the activity is in a spread of 453.025 — 453.95 and again at 456.025 — 459.95 MHz.

In the UHF band, the overall spread of 456.025 — 459.95 and again at 465.025 — 469.975 MHz is used by mobile units and control stations associated with base and repeater units which operate 5 MHz lower (that is, 451.025 — 454.95 and 460.025 — 464.975 MHz). This means that if you find an active channel inside one of these spreads, you can look 5 MHz lower (or higher as the case may be) to find the major base station/repeater for that radio service.

A handy book to have is the *POLICE CALL RADIO DIRECTORY* for your region. Stop by your local Radio Shack store and ask about it. It has complete listings, by frequency, of the various radio services in the bands covered by your PRO-2003. These Directories are updated every year, so get a current one.



# TYPICAL BAND USAGE

The following is an abbreviated listing of what's going on in the frequency ranges your PRO-2003 can receive—it'll help you decide which ranges you'd like to choose. Here's a list of abbreviations used:

Affiliate Radio System.....	MARS	Mobile Telephone .....	Mob. Tel.	148.010 .....	MARS	169.450 ~ 169.725 .....	Ind., Datt
Armateur .....	Ham	Motion Picture .....	Mot. P.	148.15 .....	CAP	170.150 .....	F.D., B.C., R
Automobile Emergency .....	Auto Emer.	Motor Carrier .....	Buses, Trucks	148.155 ~ 148.250 .....	MIL	170.200 ~ 170.220 .....	U.S.C.G.S
Broadcast Remote .....	BC, R.	National Parks .....	Nat. Pk.	148.290 ~ 150.750 .....	UN	170.225 ~ 170.325 .....	Ind., Land Tr
Bureau of Reclamation.....	Bur. Recl.	Petroleum .....	Pet.	150.815 ~ 150.995 .....	Bus.	170.425 ~ 170.575 .....	For. Cons
Civil Air Patrol .....	CAP	Police .....	P.D.	151.010 ~ 151.130 .....	Hwy.	170.975 ~ 171.250 .....	Bur. Recl., For. Cons.
Department of Agriculture .....	Ag. and For.	Power Utilities .....	Power	151.145 ~ 151.475 .....	For. Cons.	171.388 ~ 172.725 .....	Ind., Dept. Ag. & For., Govt.
and Forestry .....	F.D.	Radio Paging .....	Page	151.505 ~ 151.595 .....	Sp. Ind.	172.775 .....	Nat. Pk.
Fire Department .....	For. Prod.	Railroad .....	R.R.	151.625 ~ 151.955 .....	Bus.	173.025 .....	U.S.C.G.S.
Forest Products .....	For. Cons.	Red Cross .....	Press	151.985 ~ 152.240 .....	Mob. Tel. (RCC)	173.075 .....	U.S.C.G.S.
Forestry Conservation .....	Govt.	Relay Press.....	St. P.D.	152.270 ~ 152.450 .....	Taxi	173.204 ~ .....	Mot. P., Pet., Bur. Recl., Press Relay.
Government .....	Govt.	State Police .....	Sp. Ind.	152.480 ~ 152.840 .....	Mob. Tel. Page		
Highway Maintenance .....	Hwy.	Special Emergency .....	Taxi	152.870 ~ 153.020 .....	Sp. Ind., Mot. P.		
Indian Affairs .....	Land Tr.	Telephone Radio .....	U.S. Coast	153.050 ~ 153.440 .....	Pet., For. Prod.		
Land Transportation .....	Land Tr.	Telephone Maintenance .....	U.S. Navy	153.470 ~ 153.710 .....	Power		
Local government .....	L. Govt.	U.S. Coast	U.S.C.G.S.	153.740 ~ 154.115 .....	L. Govt.		
Manufactures .....	Mfg.	and Geodetic Survey .....	USN	154.130 ~ 154.445 .....	F.D.		
Marine .....	MIL	U.S. Navy .....	U.S.W.B.	154.455 ~ 154.600 .....	Sp. Ind., Pet., Bus.		
Military .....		U.S. Weather Bureau .....		154.655 ~ 155.145 .....	P.D., L. Govt., St. P.D.		
				155.160 ~ 155.400 .....	Sp. Emer., P.D.		
				155.415 ~ 156.030 .....	P.D., L. Govt.		
				156.045 ~ 156.240 .....	Hwy., P.D.		
				156.275 ~ 157.425 .....	Marine		
				157.456 ~ 157.500 .....	Auto Emer.		
				157.530 ~ 157.710 .....	Taxi		
				157.740 ~ 158.100 .....	Mob. Tel., Page		
				158.130 ~ 158.460 .....	Power, For. Prod., Pet.		
				158.490 ~ 158.700 .....	Mob. Tel. (RCC)		
				158.730 ~ 158.970 .....	P.D., L. Govt.		
				158.985 ~ 159.210 .....	P.D. Hwy.		
				159.225 ~ 159.465 .....	For. Cons.		
				159.510 ~ 160.200 .....	Trucks		
				160.215 ~ 161.565 .....	R.R.		
				161.600 ~ 162.000 .....	Marine		
				162.026 ~ 162.175 .....	Bur. Recl.		
				162.400 .....	U.S.W.B.		
				162.550 .....	U.S.W.B.		
				163.125 ~ .....	Indian Affairs		
				163.175 ~ .....	Bur. Recl.		
				163.275 .....	U.S.W.B.		
				163.388 ~ 163.538 .....	MIL		
				163.825 ~ 163.975 .....	Govt.		
				164.025 ~ 164.075 .....	U.S.C.G.S.		
				164.175 ~ 165.188 .....	Bur. Recl., Nat. Pk.,		
				169.300 .....	Govt., Agr. & For.		
					F.A.A.		



In some large metropolitan areas, 1 or 2 channels of the "TV Band" (470 MHz to 512 MHz) are used for special communications. Each station (channels 14 through 20) uses 6 MHz:

470 ~ 476 T.V. Channel 14  
 476 ~ 482 T.V. Channel 15  
 482 ~ 488 T.V. Channel 16  
 488 ~ 494 T.V. Channel 17  
 494 ~ 500 T.V. Channel 18  
 500 ~ 506 T.V. Channel 19  
 506 ~ 512 T.V. Channel 20

Where these frequencies are assigned for special communications, in lieu of a T.V. station, the 6 MHz segment is allocated as shown here for channel 14 (470 ~ 476 MHz).

470.0125 ~ 470.2875	Domestic Public, (Base, Mob.)	473.0125 ~ 473.2875	Domestic Public
470.3125 ~ 471.1375	Public Safety	473.3125 ~ 474.1375	Public Safety
471.1625 ~ 471.2875	Reserve Pool A	474.1625 ~ 474.2875	Reserve Pool A
471.3125 ~ 471.4125	Pwr., Tel. Maint.	474.3125 ~ 474.4125	Pwr., Tel. Maint.
471.4375 ~ 471.6375	Spec. Ind.	474.4375 ~ 474.6375	Spec. Ind. (Mobile)
471.6625 ~ 471.7875	Reserve Pool B	474.6625 ~ 474.7875	Reserve Pool B
471.8125 ~ 472.3375	Bus.	474.8125 ~ 475.3375	Bus.
472.3625 ~ 472.4375	Taxi	475.3625 ~ 475.4375	Taxi
472.4675 ~ 472.7875	R.R., Motor Carrier, Auto Emer.	475.4625 ~ 475.7875	R.R., Motor Carrier, Auto Emer.
472.8125 ~ 472.9875	Pet., For. Prod., Mfg.	475.8125 ~ 475.9876	Pet., For. Prod., Mfg.

The same allocation pattern is repeated for each of the TV channels 14 through 20. For example, if channel 17 is assigned for communications in your area, "Taxi" would be 490.3625 to 480.4375 and 493.3625 to 493.4375 (corresponding to 472.3625 to 472.4375 and 475.3625 to 475.4375 above). Note that in the example, we added three TV channels (18 MHz) to the channel 14 frequencies.

## SOME RANDOM NOTES

You'll soon notice some differences between reception on the aircraft band (108–136 MHz) and the other ranges covered by your PRO-2003. Aircraft band stations use AM, while stations on the other ranges covered by your PRO-2003 use FM. Don't be too surprised if reception is a bit "noisier" on the aircraft band than others. Your PRO-2003 will automatically switch over to AM or FM depending on the frequency you wish to listen on.

Reception on the frequencies covered by your PRO-2003 is mainly "line of sight." That means you usually won't be able to hear stations located beyond the horizon at your listening location. You'll be able to hear aircraft at greater distances than ground stations. And during the summer months you may be able to hear stations in the 30–50 MHz range located several hundred or even thousands of miles away. This is due to summer atmospheric conditions; this type of reception is unpredictable (but often very interesting!).

One very useful service is the National Weather Service's continuous weather broadcasts. These broadcasts contain weather forecasts and data for the area around the station plus bulletins on any threatening weather conditions. These stations use three frequencies—162.40, 162.475 or 162.55 MHz. In most areas of the country you will be able to receive one of these frequencies.

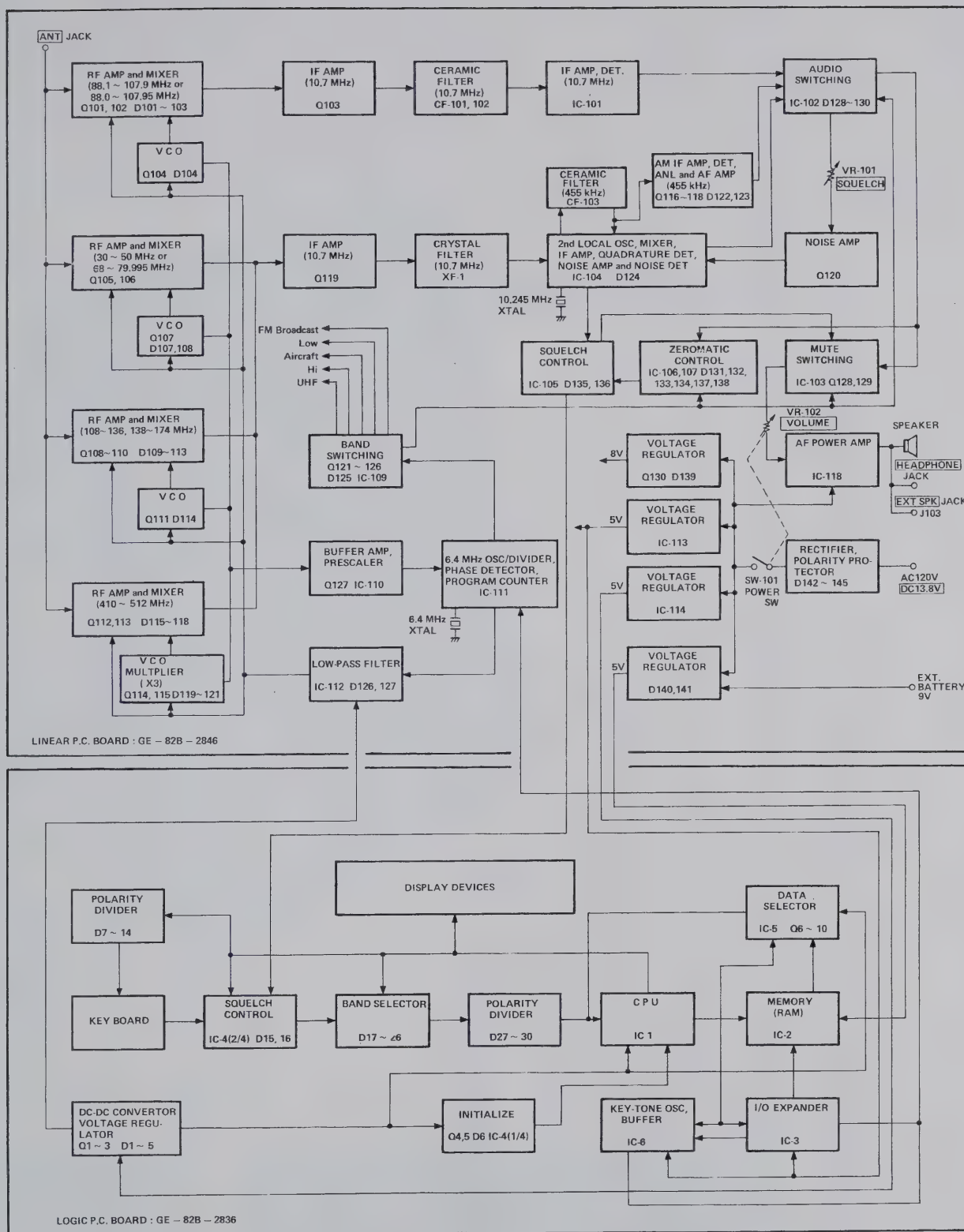














### RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 1 year from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

*We Service What We Sell*

### U.S. PATENT NOS.

3,794,925  
3,801,914  
3,961,261  
3,962,644  
4,027,251  
4,092,594  
4,123,715  
4,245,348

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# Programmable AM/FM Scanning Receiver

with Direct Keyboard Entry System

VHF: 30-50/88.1-107.9/108-136/138-174 MHz UHF: 410-512 MHz



**PR0-2003**

**OWNER'S  
MANUAL**

PLEASE READ BEFORE  
USING THIS EQUIPMENT

**REALISTIC®**

**CAT. NO.  
20-117**

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION



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You'll hear all the action with your new Realistic PRO-2003 Programmable Scanning Receiver! You'll have direct access to 20584 different frequencies in nine radio bands—police, fire, ambulances, aircraft, ham radio operators, transportation services and FM broadcast! And you can program your PRO-2003 to scan up to fifty channels and ten FM Broadcast Band memory channels so you won't miss any of the excitement.

The secret to the PRO-2003 is a custom-designed microprocessor—a computer on a chip! The front panel Keyboard lets you easily enter and change frequencies whenever you wish. The microprocessor also gives you special functions not found on other scanning receivers. Curious about what's on the air in your area? The PRO-2003 will automatically "search" frequency ranges of your choice for active stations—you can locate new stations and services easily! And if there's a frequency you're especially interested in, the PRIORITY Key will make sure you never miss a call on it. You can listen or scan other channels and your PRO-2003 will automatically switch to the channel when a call is received on it!

Other features you'll appreciate include Lockout to skip over channels during scanning and fast/slow search and scanning rates.

Your PRO-2003 achieves its superior performance through the use of the very latest in solid-state technology. In addition to the microprocessor, the PRO-2003 has a phase-locked loop (PLL) IC, 8 CMOS ICs, 10 integrated circuits, 41 transistors, 83 diodes and a Fluorescent Display.

## ADDITIONAL FEATURES

- \* Covers 30—50 MHz (VHF Lo), 88.1—107.9 MHz (FM Broadcast), 108—136 MHz (aircraft), 138—144 MHz (government), 144—148 MHz (ham radio operators), 148—174 MHz (VHF Hi), 410—450 MHz (ham radio and government), 450—470 MHz (UHF Lo) and 470—512 MHz (UHF Hi)—20584 channels!
- \* Large multi-purpose Fluorescent Display shows which channels and frequencies are being scanned, monitored or programmed.
- \* Two second scan delay function eliminates missed replies.
- \* Crystal filter for 1st IF (10.7 MHz) plus ceramic filter for 2nd IF (455 kHz).
- \* Two ceramic filters (10.7 MHz) for FM broadcast band.
- \* AC and DC (negative ground) operation.
- \* 9-volt battery backup holds memorized frequencies in case of power failure.

For Your own protection, we urge you to record the Serial Number of this unit in the space provided. You'll find the Serial Number on the back panel of this unit.

Serial Number

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS RECEIVER TO RAIN OR MOISTURE.**

# SPECIFICATIONS

**SEMICONDUCTOR COMPONENTS:**

1 LSI Microprocessor system, 1 LSI PLL system, 8 C-MOS ICs, 10 ICs, 41 transistors and 83 diodes.

**RECEIVING SYSTEM:**

Superheterodyne with digital synthesizer to receive any of 20,584 programmable frequencies.

**FREQUENCY COVERAGE:**

- VHF-Lo  
30 – 50 MHz (in 5 kHz steps)
  - FM broadcast  
88.1 – 107.9 MHz (in 200 kHz steps)
  - Aircraft  
108 – 136 MHz (in 25 kHz steps)
  - Government  
138 – 144 MHz (in 5 kHz steps)
  - Ham  
144 – 148 MHz (in 5 kHz steps)
  - VHF-Hi  
148 – 174 MHz (in 5 kHz steps)
  - Ham/Gov't.  
410 – 450 MHz (in 12.5 kHz steps)
  - UHF-Lo  
450 – 470 MHz (in 12.5 kHz steps)
  - UHF-Hi ("T")  
470 – 512 MHz (in 12.5 kHz steps)
- Any 50 channels in any band combinations. (10 channels x 5 Banks) and 10 channels FM broadcast band.

**CHANNELS OF OPERATION:**

**SENSITIVITY**

AM: 20 dB Signal-to-Noise

ratio at 60% modulation:

FM: 20 dB Signal-to-Noise

ratio at 3 kHz Deviation:

- 108 – 136 MHz 1.0  $\mu$ V
- 30 – 50 MHz 0.5  $\mu$ V
- 138 – 174 MHz 0.5  $\mu$ V
- 410 – 512 MHz 1.0  $\mu$ V

**FM broadcast:**

30 dB Signal-to-Noise ratio at 22.5 kHz Deviation:

- 88.1 – 107.9 MHz 5.0  $\mu$ V

**SPURIOUS REJECTION:**

- 108 – 136 MHz 50 dB at 122 MHz
- 30 – 50 MHz 50 dB at 40 MHz
- 138 – 174 MHz 50 dB at 160 MHz
- 410 – 512 MHz Not specified.
- 88.1 – 107.9 MHz 50 dB at 99.9 MHz

**SELECTIVITY:**

Lo, Air, Hi, UHF:

FM broadcast:

- ±9 kHz, –6 dB
- ±15 kHz, –50 dB
- ±100 kHz, –6 dB
- ±300 kHz –50 dB

IF REJECTION:

- 10.7 MHz 80 dB at 154 MHz

SCANNING RATE:

- Fast 8 channels/sec.
- Slow 4 channels/sec.

SEARCH RATE:

- Fast 8 steps/sec.
- Slow 4 steps/sec.

PRIORITY SAMPLING:

- 2 seconds

DELAY TIME:

- 2 seconds

MODULATION ACCEPTANCE:

- ±7 kHz and 75 kHz

I.F. FREQUENCIES:

- 10.7 MHz and 455 kHz

FILTERS:

- 1 crystal filter, 1 ceramic filter for Lo, Air, Hi, UHF
- 2 ceramic filter for FM broadcast

SQUELCH SENSITIVITY:

Lo, Air, Hi, UHF:

- Threshold Less than 1.0  $\mu$ V
- Tight (S+N)/N 25 dB
- Threshold Less than 5.0  $\mu$ V
- Tight (S+N)/N 45 dB

FM broadcast:

ANTENNA IMPEDANCE:

- 50 ohms

AUDIO POWER:

- 2 watts maximum

BUILT-IN SPEAKER:

- 3" (7.7 cm)

POWER REQUIREMENTS:

- AC, 120 Volts, 60 Hz, 20 watts
- DC, 12–15 Volts, 10 watts
- 9-volt battery for Memory back-up

DIMENSIONS:

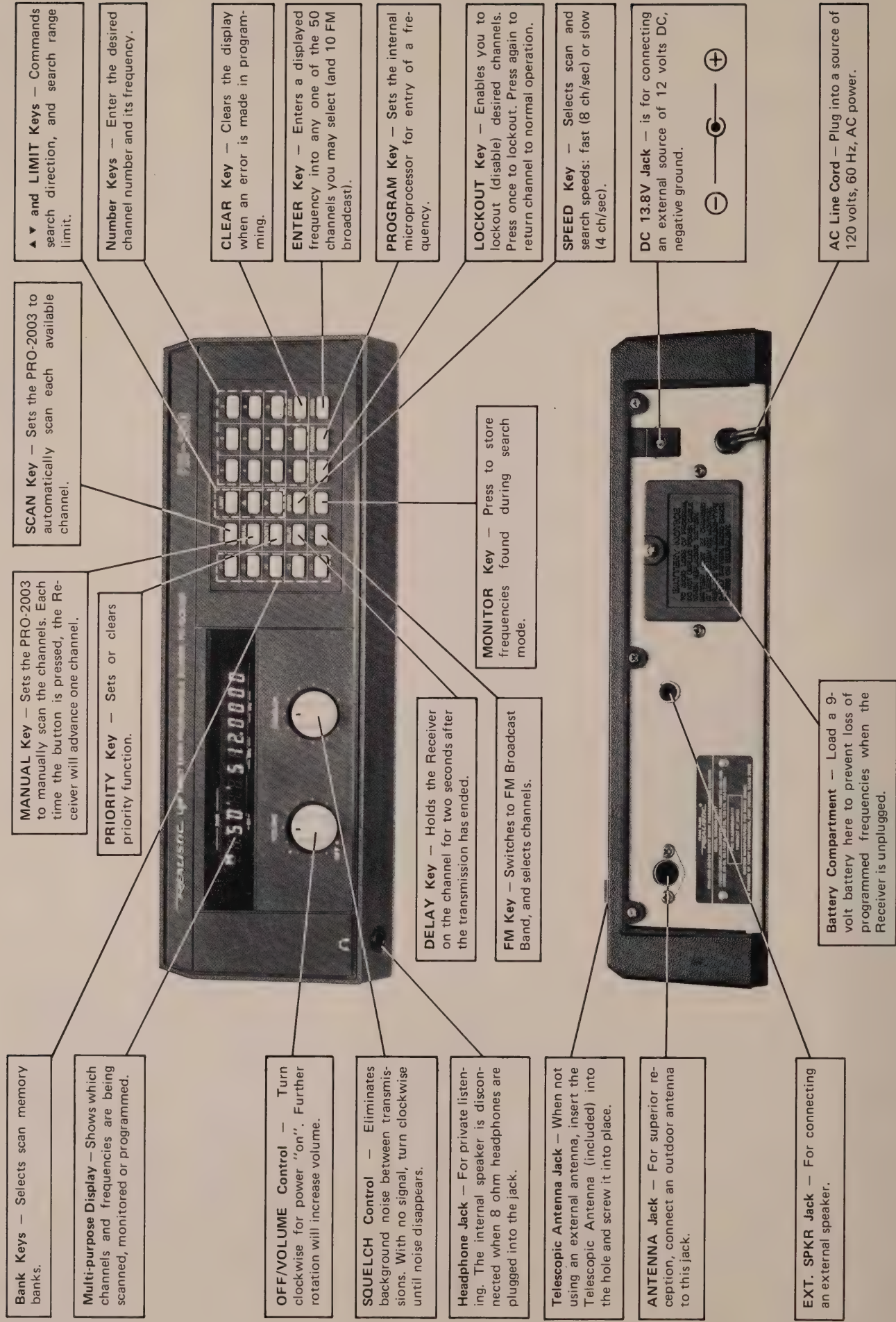
- 3-1/8" x 11-1/4" x 9" HWD
- (8 x 28.5 x 23 cm)

WEIGHT:

- 4.4 lbs (2 kg)



# A QUICK LOOK AT YOUR PRO-2003



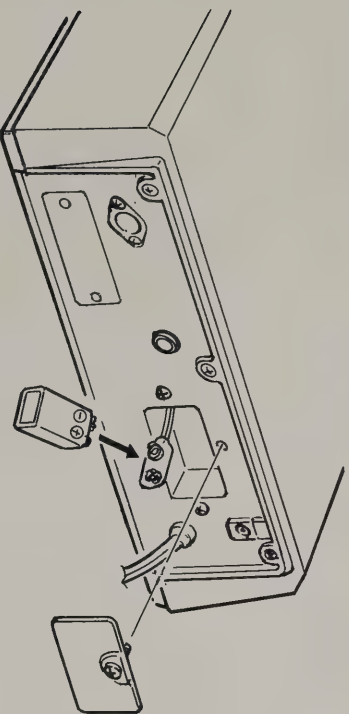
# OPERATING YOUR PRO-2003

You turn on your PRO-2003 by rotating VOLUME clockwise. When first turned on, your PRO-2003 might start scanning. Press **MANUAL** to stop the scanning.

Rotate SQUELCH fully counterclockwise. You'll hear a rushing noise from the Speaker. Slowly rotate SQUELCH clockwise until the noise just stops. You're now ready to start entering frequencies!

# Understanding the Display

The Fluorescent Display on your PRO-2003 can display the channel number, the frequency being received and special symbols to indicate different functions. Here's a brief rundown on what those symbols mean when receiving stations.



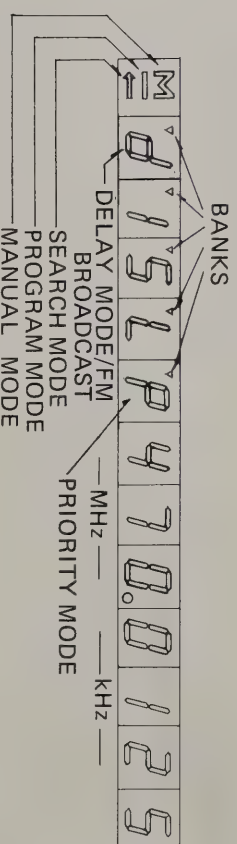
Your PRO-2003 can keep channels stored in its memory for a short period of time even with the AC cord unplugged and the 9-volt battery disconnected. (This is so you can replace the battery with the AC cord unplugged, without losing all the programmed information.) For best results, replace the battery every six months.

**CAUTION:** Never leave a weak or dead battery in your PRO-2003, even "leakproof" types can leak damaging chemicals. Battery life will be shortened if AC or DC power is off for a prolonged period.

Your PRO-2003 comes with a Telescopic Antenna. Insert it into the Telescopic Antenna jack on the top of your PRO-2003 and screw it into place. Extend it to full length.

For best reception, you'll need an external antenna. Your local Radio Shack has an excellent antenna for both VHF and UHF reception (Cat. No. 20-176). You can also find mounting hardware, cables and connectors at Radio Shack. You'll find that reception improves the higher you mount the antenna.

Connect your Receiver to a standard 120 volt AC wall outlet.



# RECEIVER OPERATIONS DISPLAY

470.0125	Frequency	M	Manual mode
.....	Delay mode	—	Program mode
.....	Priority mode	←	Search mode
15	Channel indicator	L	Lock out
Bank indicators		F	FM BROADCAST
1 2 3 4 5	Channel Banks		
▼ ▼ ▼ ▼ ▼			



## About Those Banks . . .

You might be wondering what the “bank indicators” on the Fluorescent Display stand for. When you hear the word bank, you think of a place where money is kept . . . in your PRO-2003, banks are where frequencies are kept!

The fifty channels of your PRO-2003 are stored in five Banks of ten channels each. They’re stored in the following way:

Bank	Channels	Key
1	1 – 10	<b>10</b>
2	11 – 20	<b>20</b>
3	21 – 30	<b>30</b>
4	31 – 40	<b>40</b>
5	41 – 50	<b>50</b>

You can have your PRO-2003 scan any or all five Banks. If you want a bank to be scanned, press the Key for that Bank; the indicator for that bank will light on the display. If you don’t want that bank to be scanned, press the Key again; the indicator will go off.

Let’s take an example. Suppose you only want to monitor channels 1 through 10 and 21 through 30. Press the Keys for Banks 1 and 3. You’ll see the Bank Indicators light up on the Display as shown in the illustration. Your PRO-2003 will now scan channels 1 to 10 and 21 to 30. If you want to change the channels scanned, press the Keys for Banks 1 and 3 (to turn them “off”) and press the Keys for the new ranges you want to scan.

### Channel Selection

1. Press **MANUAL** to select the MANUAL mode.
2. Press **MANUAL** to shift the channel. Each press shifts one channel—repeat pressing **MANUAL** until you reach the desired channel, or
3. Press **1** **5** **MANUAL** to select channel 15. If **MANUAL** is not pressed after pressing **1** and **5** the Scanner automatically reverts to previous channel after 10 seconds.

### FM Broadcast Band Selection:

1. Press **FM** to select the FM mode; F 1 will be displayed.
2. Press **FM** to shift the channel. Each press shifts one channel—repeat pressing **FM** until you reach the desired channel, or
3. Press **1** **0** **FM** to select F 10. If **FM** is not pressed after pressing **1** and **0**, the Scanner automatically reverts to the previous channel after 10 seconds.

## Programming Your Scanner

### Public Service Frequencies

Before programming frequencies, make sure your PRO-2003 is turned on and the SQUELCH is adjusted as we described earlier.

Suppose you want to program channel 1 to receive 162.55 MHz. Here’s how you would do it:

1. Press **MANUAL** and select channel 1. You can do this in two ways: press **MANUAL** continuously until the Display indicates channel 1 or press **1** **MANUAL**.
2. Press **PROGRAM**.
3. Press **1** **6** **2** **5** **5**. Check the Display to make sure the frequency it shows is the one you meant to program. If it is, press **ENTER**.
4. To add more frequencies, press **PROGRAM** to advance to the next channel and follow the steps above.
5. If you ever want to change the frequency entered for a specific channel, enter the new frequency “over” the old frequency, using steps 1, 2, and 3.

## FM Broadcast Frequencies

Suppose you want to program F 1 to receive 88.100 MHz. Here's how you would do it:

1. Press **[FM]** and select channel F 1: press **[FM]** continuously until the Display indicates F 1 or press **[1][FM]**.
2. Press **[PROGRAM]**.
3. Press **[8][8][.] [1]**—check the display to make sure the frequency it shows is the one you meant to program; if it is, press **[ENTER]**.
4. To add more frequencies, press **[PROGRAM]** to advance to the next channel and follow the steps above.
5. If you ever want to change the frequency entered for a specific channel, enter the new frequency “over” the old one using steps 1, 2 and 3.

If **[ENTER]** is not pressed after pressing the numeric keys, it reverts to previous mode after 10 seconds.

Make a mistake while entering a frequency? Simply press **[CLEAR]**, enter the correct frequency and press **[ENTER]**. If you're entering a new frequency in place of an old one, the old frequency won't be “erased” when you press **[CLEAR]**. It will remain stored on that channel until you correctly enter a new frequency and press **[ENTER]**.

You'll hear a “beep” sound as you press the various keys. This lets you know the Key has been properly entered into your PRO-2003.

**Note:** Set the SQUELCH control fully counter-clockwise when listening to FM broadcasts.

When listening to FM broadcasts, the Priority feature might not be usable because the SQUELCH setting necessary for channel 1 will not allow the FM channel to be heard. Also, the chopping sound caused by the priority check can be annoying, when listening to music. In either case, simply cancel the Priority function.

## Using the Scanning Function

Your PRO-2003 will automatically scan all the channels you've programmed and stop whenever it finds a signal. To scan channels, press the **[SCAN]** Key.

*Important!* Your PRO-2003 won't scan unless SQUELCH is set to the point where no sound is heard if a signal isn't being received.

You can select which of the five Banks your PRO-2003 will scan by pressing the appropriate Bank Keys as we mentioned earlier. You can scan any combination of Banks, from one to all five.

You can't “turn off” all the Banks—pressing the last key out of the 5 Bank keys will not turn off that bank. One Bank always remains on.

Scanning function over FM Broadcast Channels (F 1 to F 10) is not possible—you must select the desired channel manually.

## Lockout Function

You can't “lockout” all the Channels. All channels in a Bank can't be locked out—try locking out all the channel in one bank. When you reached to the last channel, pressing **[LOCKOUT]** will have no effect. One channel in each Bank always remains. This is to maintain the scanning function: if all channels are locked out, scanning will not be possible.

However, if you don't want to hear any channels in a given bank, lockout the entire Bank by pressing its BANK button so that the BANK indicator goes off.

1. Press **[MANUAL]** to stop scanning. Continue to press **[MANUAL]** to advance to the channel you want to lock out. Or press the numbers of the desired Channel and **[MANUAL]**.
2. When you reach the channel, press **[LOCK OUT]**. The Display will show **L** to indicate that this channel will be skipped over during scanning.  
**Lockout does not work on FM Broadcast channels.**
3. To release lockout, press **[MANUAL]** to stop scanning. Advance to the channel that is locked out and press **[LOCK OUT]** again. **L** will disappear from the Display.



## SPEED Selection

Your PRO-2003 will normally scan channels at a rate of 4 channels per second. If you press **[SPEED]**, channels will be scanned at a rate of 8 per second. Press **[SPEED]** again to return to a rate of 4 per second.

Certain programmed frequencies could be missed at the high-speed scanning—select the speed carefully.

## Priority Function

You might want to scan other channels yet not miss a call on a channel of particular interest to you (police, fire, ambulance, etc.). The Priority function will let you scan other channels—but if a call is received on the Priority channel, your PRO-2003 will automatically switch to the Priority channel! Here's how to use the Priority function:

1. Only Channel 1 can be used as the Priority Channel: Key the desired frequency into channel 1. It will be checked every 2 second.
2. Priority works only when the unit is in Scan, Manual or FM Broadcast Band mode.
3. Press **[PRIORITY]** to start Priority function. A **P** will appear on the display.
4. Press **[MANUAL]**, **[SCAN]** or **[FM]** to listen to other channels. Your PRO-2003 will check the Priority Channel and switch to it if a signal is received.
5. To cancel Priority, press **[PRIORITY]** again. The **P** will disappear from the Display.

*Important!* Your PRO-2003 won't function unless SQUELCH is set to the point where no sound is heard if a signal isn't being received.

## SEARCHING WITH YOUR PRO-2003

### Public Service Frequencies

One great feature of your PRO-2003 is its ability to search for frequencies being used. This means you can hear all the action on the airwaves in your area! To use this great feature, follow these steps:

1. Press **[PROGRAM]**.
2. Press **[LIMIT]**. Enter the lower limit of the frequency range to be searched (such as 45.00 MHz). Press **[ENTER]**.
3. Press **[LIMIT]** again. Enter the upper limit of the frequency range to be searched (such as 46.00 MHz). Press **[ENTER]**.
4. Press either **[▲]** or **[▼]** to start Search. **[▼]** will start Search from highest frequency and go down while **[▲]** will start from the lowest frequency and go up.
5. You can control the speed of the Search by using the **[SPEED]**. Key the same way you use it during scanning.
6. Search will stop when a frequency is found with a signal. To restart Search, press **[▲]** or **[▼]**. While **[▲]** or **[▼]** is held searching will not stop.

In the PROGRAM mode, the search range will be displayed each time **[LIMIT]** is pressed. It is impossible to change the lower frequency only: to change the lower frequency you must change the higher frequency. The higher frequency can be changed any time.

### FM Broadcast Frequencies

FM Broadcasting Band which spans 88.100 — 107.900 MHz is programmed at 200 kHz step. To "search" for the FM Broadcast Band:

1. Press either **[▲]** or **[▼]** to start Search. **[▼]** will start Search from the highest frequency and go down while **[▲]** will start from lowest frequency and go up.
2. You can control the speed of the Search by using **[SPEED]**.
3. Search will stop when a frequency is found with a signal. To restart Search press **[▲]** or **[▼]**. While **[▲]** or **[▼]** is held, searching will not stop.

You can step through every possible FM frequency by setting the SQUELCH control fully counter-clockwise and then pressing either the **▲** or **▼** button. Move the SQUELCH control clockwise for automatic searching for strong stations.

## Storing Frequencies

If you want to enter some of the frequencies found during Search, do this:

1. Press **MONITOR** when your PRO-2003 finds a frequency you want to store.
2. Use the **MANUAL** Key to select a channel for the frequency. Your PRO-2003 found. The Display will show the frequency currently stored on the channel, but don't worry—the old frequency will be erased when you start to enter the new one. For FM Broadcast Band, use **FM** instead of **MANUAL**.
3. Press **PROGRAM**.
4. Press **MONITOR** again. The new frequency found during the Search will be displayed.
5. Press **ENTER** to put the new frequency into the channel in place of the old frequency.
6. Press either **▲** or **▼** to resume the Search. To return to Manual or Program operation, press **MANUAL** or **PROGRAM**. To resume the Search from one of the limit frequencies, press **LIMIT** and then **▲** or **▼**.

## Delay Function

When your PRO-2003 is scanning, it will stop whenever it finds a signal on a channel. As soon as the signal ends, the scanning function will resume. Most communications heard will be two-way. To make sure you don't miss any replies, press **DELAY**. This will cause your PRO-2003 to stay on a channel for two seconds after the end of a transmission, giving you time to hear any reply. To release the Delay function, press **DELAY** again. The Delay indicator will show on the Display when the Delay function is used.

## ERROR INDICATIONS

Sometimes when you try to enter a frequency for a channel or as a Search range limit, you will see **ERROR**, on the Display. This means the frequency is in error and you won't be able to enter it into your PRO-2003.

Such frequency errors usually mean you've entered a frequency outside the ranges your PRO-2003 operates on (such as 225.00 MHz) or you've put the decimal point in the wrong place (14.682 MHz instead of 146.82 MHz). Check carefully to find your mistake and then press **CLEAR**. You can now enter the correct frequency.

## ALL CLEAR FUNCTION

Your PRO-2003 provides an ALL CLEAR Function.

If you ever want to clear all programmed Memory (initialize the CPU in technical jargon), do this:

Press **1** and **CLEAR** simultaneously, and turn the Power Switch on. All memory will be cleared and frequency will show 000.0000.

## In case you're wondering . . .

... the tuning range of your PRO-2003 is permanently stored in the microprocessor chip. There's no way it can be extended or altered—even by a skilled electronics technician. So if you try to enter a frequency not in the PRO-2003's tuning ranges, you'll get an error message every time! To listen to CB, shortwave or broadcasting bands, you'll need another receiver designed for that purpose.



## BIRDIES

Some frequencies may be difficult or impossible to receive. If you program-in one of these, the Scanner may lock up and you hear only noise. These "birdies" are the products of internally generated signals mixing with external signals like TV and FM broadcasts. Telescopic antennas are much more likely to pick up these undesirable signals—that is another good reason for getting an outdoor, base-station type antenna for home installations.

If the interference is not severe, you may be able to use SQUELCH to cut out such annoying birdies.

A few of the most common birdies to watch out for are listed below.

Low Band	FM Broadcast	Air Band	Hi Band
30.030 MHz }	94.900 MHz	108.800 MHz	140.795 MHz
30.090	95.100	115.200	140.800
31.990	95.300	119.400	140.805
}	96.100	121.600	146.420
32.010	{	125.800	{
32.070		{	
}	97.700	125.875	146.440
32.150		128.000	149.390
35.800		131.900	{
}		{	
35.855		132.150	149.410
36.800			151.065
{			{
36.900			151.085
38.395			153.190
38.400			{
38.405			
42.600			153.500
}			153.590
42.895			{
44.790			
}			{
44.810			
45.575			153.605
{			162.190
			{
45.605		{	
46.310			162.205
{		{	
46.415		166.395	
48.675		{	
48.795			
		166.410	

Even with the SQUELCH control set to maximum, scanning or searching may stop on or around some of the frequencies listed. If the spurious signal is strong enough (above 20  $\mu$ V in technical terms) you can listen to it, but the Receiver will not auto scan/search.

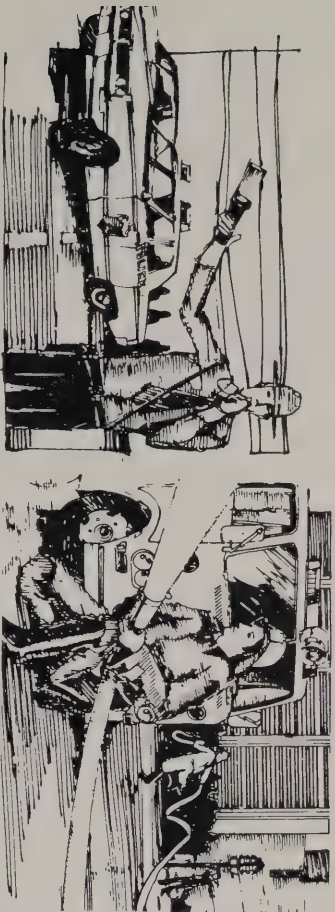
## INSTALLATION

In any communications receiver installation, the antenna is one of the most important parts of the set-up. Although the telescopic antenna we've included will be adequate for strong local signals, the best reception will result from a multi-band outdoor antenna. It should be mounted as high as possible since the VHF and UHF signals your Receiver picks up travel in a straight line. The higher your antenna, the better your reception. Your local Radio Shack can help you in the selection of antennas, cables and accessories. (They can also advise you on the most popular frequencies in your area.)

## ACCESSORIES

A pair of headphones can be a very useful accessory. In areas where a high noise is present (in a factory, at the scene of a fire or accident, etc.), or when you want to listen privately, use headphones. Your Radio Shack store has a selection for your PRO-2003. Just plug them into the front panel headphone Jack.

You can use our 12V DC Power cord 270-1534A in your vehicle and power your PRO-2003 directly from the battery in your vehicle.



Using receivers capable of covering police, fire, emergency and ambulance frequencies in your car may be restricted by law in some areas. Before installing your PRO-2003 in your car, check to be sure of the regulations in your locality.

## GUIDE TO THE ACTION BANDS

Lots of things are going on that most of us are never aware of. But, with the right frequencies programmed into your PRO-2003, you can monitor such exciting signals. You'll have to do a little investigating in your community to find out what services are active and on what frequencies.

What to listen for and where? That is a little difficult for a specific answer. Each area of the country can and will use different channels. All we can do is give you some general pointers and then let you take it from there.

Find out if there is a local club which monitors these frequencies. Often a local electronics repair shop that does work on the equipment can give you the channel frequencies used by local radio services. A volunteer police or fire employee can also be a good source of this information.

An interesting service is the Mobile Telephone. FCC has assigned this service channels in the range of 152.51 to 152.81 MHz at every 0.030 MHz (channels are 30 kHz apart). Also, 454.375 to 454.95 MHz with channels 25 kHz apart from 454.375 to 454.625 and then every 50 kHz up to 454.95.



You can hear air navigation between 108 — 118 MHz. Communications between aircraft and airport control towers can be found between 118 — 136 MHz.

As a general rule on VHF, most activity will be concentrated between 153.785 and 155.98 and then again from 158.73 to 159.46 MHz. Here you'll find local government, police, fire and most such emergency services. If you are near a railroad yard or major railroad tracks, look around 160.0 to 161.9 for signals.

In some of the larger cities, there has been a move to the UHF bands for these emergency services. Here, most of the activity is in a spread of 453.025 — 453.95 and again at 456.025 — 459.95 MHz.

In the UHF band, the overall spread of 456.025 — 459.95 and again at 465.025 — 469.975 MHz is used by mobile units and control stations associated with base and repeater units which operate 5 MHz lower (that is, 451.025 — 454.95 and 460.025 — 464.975 MHz). This means that if you find an active channel inside one of these spreads, you can look 5 MHz lower (or higher as the case may be) to find the major base station/repeater for that radio service.

A handy book to have is the *POLICE CALL RADIO DIRECTORY* for your region. Stop by your local Radio Shack store and ask about it. It has complete listings, by frequency, of the various radio services in the bands covered by your PRO-2003. These Directories are updated every year, so get a current one.



# TYPICAL BAND USAGE

The following is an abbreviated listing of what’s going on in the frequency ranges your PRO-2003 can receive—it’ll help you decide which ranges you’d like to choose. Here’s a list of abbreviations used:

Affiliate Radio System	MARS
Armateur	Ham
Automobile Emergency	Auto Emer.
Broadcast Remote	BC. R.
Bureau of Reclamation	Bur.’Recl.
Civil Air Patrol	CAP
Department of Agriculture	
and Forestry	Agr. and For.
Fire Department	F.D.
Forest Products	For. Prod.
Forestry Conservation	Fors. Cons.
Government	Govt.
Highway Maintenance	Hwy.
Indian Affairs	
Land Transportation	Land Tr.
Local government	L. Govt.
Manufactures	Mfg.
Marine	
Military	MIL

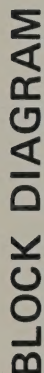
Mobile Telephone	Mob. Tel.
Motion Picture	Mot. P.
Motor Carrier	Buses, Trucks
National Parks	Nat. Pk.
Petroleum	Pet.
Police	P.D.
Power Utilities	Power
Radio Paging	Page
Railroad	R.R.
Red Cross	
Relay Press	Press
State Police	St. P.D.
Special Emergency	Sp. Ind.
Taxicab Radio	Taxi
Telephone Maintenance	Tel. Maint.
U.S. Coastal	
and Geodetic Survey	U.S.C.G.S.
U.S. Navy	USN
U.S. Weather Bureau	U.S.W.B.

## 30 ~ 50 MHz Band (0.020 MHz or 20 kHz spacing)

30.01 ~ 30.56	Govt.
30.56 ~ 30.62	Sp. Ind.
30.66 ~ 31.24	Ind. (Pet., For. Cons., Bus., For. Prod.)
31.26 ~ 31.98	Sp. Ind., For. Cons.
32.00 ~ 33.00	Govt.
33.02 ~ 33.16	Hwy., Sp. Emer., Bus.
33.18 ~ 33.38	Pet.
33.42 ~ 33.98	F.D.
34.00 ~ 35.00	Govt.
35.02 ~ 35.18	Bus.
35.22 ~ 35.66	Mob. Tel. & Page
35.70 ~ 35.72	Bus.
35.74 ~ 35.98	Sp. Ind. & Bus.
36.00 ~ 37.00	Govt.
37.02 ~ 37.44	P.D. & L. Govt.
37.46 ~ 37.86	Power
37.90 ~ 37.98	Hwy. & Sp. Emer.
38.00 ~ 39.00	Govt.

39.02 ~ 39.98	P.D., L. Govt.
40.00 ~ 42.00	Govt.
42.02 ~ 42.94	St. P.D.
42.96 ~ 43.18	Sp. Ind. & Bus.
43.22 ~ 43.68	Mob. Tel. Page
43.70 ~ 44.60	Trucks, Bus.
44.62 ~ 45.06	St. P.D., For. Cons.
45.08 ~ 45.66	P.D.
45.68 ~ 46.04	P.D. Hwy., Sp. Emer.
46.06 ~ 46.50	F.D.
46.52 ~ 46.58	L. Govt.
46.60 ~ 47.00	Govt.
47.02 ~ 47.40	St. Hwy.
47.42 ~ 47.88	Red Cross
47.44 ~ 47.68	Sp. Ind., Sp. Emer.
47.70 ~ 48.54	Power
48.56 ~ 49.58	For. Prod., Pet.
49.60 ~ 50.00	Govt.
88.1 ~ 107.9 MHz Band Standard FM broadcast	
108 ~ 136 MHz Band	
108 ~ 118	Air Navigation
118 ~ 136	Aircraft

144 ~ 148 MHz 2 Meter Amateur (Ham) Band	
148 ~ 174 MHz Band Mixed Spacing (15, 20, 25 kHz)	
148.010	MARS
148.15	CAP
148.155 ~ 148.250	MIL
148.290 ~ 150.750	USN
150.815 ~ 150.995	Bus.
151.010 ~ 151.130	Hwy.
151.145 ~ 151.475	For. Cons.
151.505 ~ 151.595	Sp. Ind.
151.625 ~ 151.955	Bus.
151.985 ~ 152.240	Mob. Tel. (RCC)
152.270 ~ 152.450	Taxi
152.480 ~ 152.840	Mob. Tel. Page
152.870 ~ 153.020	Sp. Ind., Mot. P.
153.050 ~ 153.440	Pet., For. Prod.
153.470 ~ 153.710	Power
153.740 ~ 154.115	L. Govt.
154.130 ~ 154.445	F.D.
154.450 ~ 154.600	Sp. Ind., Pet., Bus.
154.655 ~ 155.145	P.D., L. Govt., St. P.D.
155.160 ~ 155.400	Sp. Emer., P.D.
155.415 ~ 156.030	P.D., L. Govt.
156.045 ~ 156.240	Hwy., P.D.
156.275 ~ 157.425	Marine
157.456 ~ 157.500	Auto Emer.
157.530 ~ 157.710	Taxi
157.740 ~ 158.100	Mob. Tel., Page
158.130 ~ 158.460	Power, For. Prod., Pet.
158.490 ~ 158.700	Mob. Tel. (RCC)
158.730 ~ 158.970	P.D., L. Govt.
158.985 ~ 159.210	P.D. Hwy.
159.225 ~ 159.465	For. Cons.
159.510 ~ 160.200	Trucks
160.215 ~ 161.565	R.R.
161.600 ~ 162.000	Marine
162.026 ~ 162.175	Bur. Recl.
162.400	U.S.W.B.
162.550 ~	U.S.W.B.
163.125 ~	Indian Affairs
163.175 ~	Bur. Recl.
163.275	U.S.W.B.
163.388 ~ 163.538	MIL
163.825 ~ 163.975	Govt.
164.025 ~ 164.075	U.S.C.G.S.
164.175 ~ 165.188	Bur. Recl., Nat. Pk., Govt., Agr. & For.
169.300	F.A.A.
169.450 ~ 169.725	Ind., Data
170.150	F.D., BC. R.
170.200 ~ 170.220	U.S.C.G.S.
170.225 ~ 170.325	Ind., Land Tr.
170.425 ~ 170.575	For. Cons.
170.975 ~ 171.250	Govt. Ind., Land Tr.
171.388 ~ 172.725	Bur. Recl., For. Cons., Ind., Dept. Ag. & For., Govt.
172.775	Nat. Pk.
173.025	U.S.W.B.
173.075	U.S.C.G.S.
173.204 ~	Mot. P., Pet., Bur. Recl. Press Relay.
430 ~ 450 MHz Amateur (Ham) Band	
450 ~ 512 MHz Band (25 kHz Spacing)	
450.050 ~ 450.950	BC. R.
451.000 ~ 451.150	Util.
451.175 ~ 451.750	For. Prod., Pet., Pwr., Tel. Maint
451.775 ~ 451.975	Spec. Ind.
452.000 ~ 452.500	Taxi, Mot. Carrier, R.R.
452.525 ~ 452.600	Auto Club
452.625 ~ 452.975	Motor Carr., R.R.
453.000 ~ 453.975	L. Govt., P.D., F.D.
454.000 ~ 454.975	Mob. Tel.
455.000 ~ 455.975	Remote Br.
456.000 ~ 458.975	P.D., F.D., Ind., Lan. Tr.
459.000 ~ 459.975	Domestic Public
460.000 ~ 460.625	P.D., F.D.
460.650 ~ 462.175	Bus.
462.200 ~ 462.450	Taxi
462.750 ~ 462.975	Bus.
463.000 ~ 463.175	Medical
463.200 ~ 464.975	Bus.
465.000 ~ 467.500	P.D., F.D., Ind., Land Tr.
467.750 ~ 467.925	Bus.
467.7375 ~ 469.975	Pub. Safety, Ind., Land Tr.





### RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 1 year from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

*We Service What We Sell*

### RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102  
CANADA: BARRIE, ONTARIO L4M 4W5

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5140 NANINNE

U. K.

BILSTON ROAD WEDNESBURY  
WEST MIDLANDS WS10 7JN

### U.S. PATENT NOS.

3,794,925  
3,801,914  
3,961,261  
3,962,644  
4,027,251  
4,092,594  
4,123,715  
4,245,348



In some large metropolitan areas, 1 or 2 channels of the "TV Band" (470 MHz to 512 MHz) are used for special communications. Each station (channels 14 through 20) uses 6 MHz:

470 ~ 476 T.V. Channel 14
476 ~ 482 T.V. Channel 15
482 ~ 488 T.V. Channel 16
488 ~ 494 T.V. Channel 17
494 ~ 500 T.V. Channel 18
500 ~ 506 T.V. Channel 19
506 ~ 512 T.V. Channel 20

Where these frequencies are assigned for special communications, in lieu of a T.V. station, the 6 MHz segment is allocated as shown here for channel 14 (470 ~ 476 MHz).

470.0125 ~ 470.2875 . . . . . Domestic Public, (Base, Mob.)	473.0125 ~ 473.2875 . . . . . Domestic Public
470.3125 ~ 471.1375 . . . . . Public Safety	473.3125 ~ 474.1375 . . . . . Public Safety
471.1625 ~ 471.2875 . . . . . Reserve Pool A	474.1625 ~ 474.2875 . . . . . Reserve Pool A
471.3125 ~ 471.4125 . . . . . Pwr., Tel. Maint.	474.3125 ~ 474.4125 . . . . . Pwr., Tel. Maint.
471.4375 ~ 471.6375 . . . . . Spec. Ind.	474.4375 ~ 474.6375 . . . . . Spec. Ind. (Mobile)
471.6625 ~ 471.7875 . . . . . Reserve Pool B	474.6625 ~ 474.7875 . . . . . Reserve Pool B.
471.8125 ~ 472.3375 . . . . . Bus.	474.8125 ~ 475.3375 . . . . . Bus.
472.3625 ~ 472.4375 . . . . . Taxi	475.3625 ~ 475.4375 . . . . . Taxi
472.4675 ~ 472.7875 . . . . . R.R., Motor Carrier, Auto Emer.	475.4625 ~ 475.7875 . . . . . R.R., Motor Carrier, Auto Emer.
472.8125 ~ 472.9875 . . . . . Pet., For. Prod., Mfg.	475.8125 ~ 475.9876 . . . . . Pet., For. Prod., Mfg.

The same allocation pattern is repeated for each of the TV channels 14 through 20. For example, if channel 17 is assigned for communications in your area, "Taxi" would be 490.3625 to 480.4375 and 493.3625 to 493.4375 (corresponding to 472.3625 to 472.4375 and 475.3625 to 475.4375 above). Note that in the example, we added three TV channels (18 MHz) to the channel 14 frequencies.

## SOME RANDOM NOTES

You'll soon notice some differences between reception on the aircraft band (108–136 MHz) and the other ranges covered by your PRO-2003. Aircraft band stations use AM, while stations on the other ranges covered by your PRO-2003 use FM. Don't be too surprised if reception is a bit "noisier" on the aircraft band than others. Your PRO-2003 will automatically switch over to AM or FM depending on the frequency you wish to listen on.

Reception on the frequencies covered by your PRO-2003 is mainly "line of sight." That means you usually won't be able to hear stations located beyond the horizon at your listening location. You'll be able to hear aircraft at greater distances than ground stations. And during the summer months you may be able to hear stations in the 30–50 MHz range located several hundred or even thousands of miles away. This is due to summer atmospheric conditions; this type of reception is unpredictable (but often very interesting!).

One very useful service is the National Weather Service's continuous weather broadcasts. These broadcasts contain weather forecasts and data for the area around the station plus bulletins on any threatening weather conditions. These stations use three frequencies—162.40, 162.475 or 162.55 MHz. In most areas of the country you will be able to receive one of these frequencies.



